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(54) Title: BLOCK COPOLYMERS

(57) Abstract: Block copolymers comprise a core block formed of hydrophilic monomers and have pendant zwitterionic groups, and at least two terminal blocks, comprising stimulus-responsive groups. The core block has a degree of polymerisation of at least 100, whilst the terminal blocks have an average degree of polymerisation of at least 20. A solution of polymer in a liquid may be caused to change its characteristics, for instance rheology, upon being subjected to a stimulus such as a change in temperature or pH. Examples comprise core blocks formed of 2-methacryloyloxyethyl-2'-trimethylammonium ethylphosphate inner salt (MPC) and terminal blocks formed of 2-(diisopropylamino)ethyl methacrylate. Upon changing the pH from around 2 to around 8, an aqueous solution of the block copolymer gels, the solution becoming mobile again upon lowering the pH. The effect is due to deprotonation of a quaternary ammonium pendant ion to form a non-ionised group and subsequent protonation to form an ionised group. This changes the hydrophilicity of the terminal blocks and allowing formation of a network of micellar structures when the pendant groups are not ionised and relatively hydrophobic and associated in micelles.